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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/035,252	01/04/2002	Sang Yeon Kim	0465-0895P-SP	2924
2292	7590	11/15/2004	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH			KASSA, YOSEF	
PO BOX 747			ART UNIT	
FALLS CHURCH, VA 22040-0747			PAPER NUMBER	

2625

DATE MAILED: 11/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/035,252	Applicant(s) KIM, SANG YEON	
	Examiner YOSEF KASSA	Art Unit 2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 04 January 2002.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,6,8-10,12,15,16 and 20 is/are rejected.
- 7) ☒ Claim(s) 4,7,11,13,14 and 17-19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5, 6, 9, 10, 12, 15, 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allen et al (U.S. Patent 6,535,221), and further in view of Jiang et al (U.S. Patent 6,421,090).

With regard to claim 1, Allen et al discloses a step (a) of searching an edge direction (broadly reads on determining location of the edge information see col. 3, lines 50-53), to be used for interpolation by a pixel matching using input pixels (reads on interpolation using values from block of source pixels see col. 10, lines 43-46); and a step (b) of generating a pixel to be substantially interpolated by referring to pixels located on the searched edge direction (note that the edge located in step 330 is used to interpolate 2 by 2 source pixel see col. 10, lines 43-58).

While Allen et al discloses determining location of the edge information, he does not explicitly call for searching an edge direction. However, at the same field of endeavor, Jiang et al taught this feature (see col. 1, lines 60-65). At the time of the invention was made, it would have been obvious to a person ordinary skill in the art to incorporate the teaching of Jiang et al edge direction detecting process into Allen et al system. The motivation doing so is to performing a motion adaptive interpolation at the

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pixel, using the detected edge direction.

With regard to claim 2, Allen et al discloses wherein the step (a) determines the edge direction as 0.degree direction at a flat region having a less variation of a signal and a texture part having a severe variation of the signal (note that it is known in the art of image edge analyses that when value of  $\alpha$  (edge angle) is approaches to zero angle direction see Fig. 14, the noise or jagged artifacts will be less and the variation of signal will be less, and if the edge variation (noise) increase the signal variation increases, also see Fig. 13).

With regard to claim 3, Allen et al discloses wherein the step (a) measures, i.e., estimated edge direction, an error of each of the edge directions using a measurement function (G(Z) function)(see col. 9, lines 54-66) and determines a direction having a minimum error value of the errors as a final edge direction (see col. 9, lines 30-36).

With regard to claims 5 and 8, Allen et al discloses wherein the step (a) searches the edge direction having a minimum error by matching pixels located at upper and lower (reads on all of the pixel) lines of a pixel (see col. 8, lines 5-21) to be interpolated for a vertical and horizontal interpolation (see col. 3, lines 18-23).

With regard to claims 6, Allen et al discloses wherein the step (a) outputs a relative horizontal coordinate as a result of a vertical pixel matching in accordance with the searched edge direction (note that the output pixel value assigned bases on horizontal and vertical edge pixel value see col. 8, lines 5-18).

Claim 9 is similarly analyzed as claim 6.

With regard to claims 10, Allen et al wherein the edge directed search and interpolation in the steps (a) and (b) are carried out independently in vertical and horizontal direction respectively (see col. 3, lines 18-25 and col. 8, lines 5-11).

Claim 12 is similarly analyzed as claim 1. As to the additional limitation of vertical interpolation unit and horizontal interpolation unit (see col. 3, lines 18-30), and vertical interpolation and horizontal interpolation filtering (note that bilinear interpolation is applied to improved image quality, i.e., filtering, see col. 3, lines 18-30).

With regard to claims 15, Allen et al discloses a step (a) of carrying out a first interpolation on input pixels, i.e., source data, using linear interpolation (see col. 3, lines 18-23); and a step (b) of finding a weighted value coefficient, i.e., edge detection logic algorithm, in accordance with a relationship, i.e., comparison, between the first interpolated pixel and the adjacent input pixels to be used for interpolation (see col. 3, lines 45-55) and preparing a pixel to be substantially interpolated (note that the adjustment process is using interpolation process) applying the found weighted value coefficient to the adjacent input pixels (see col. 3, lines 55-63).

Allen et al did not explicitly call for adaptive interpolation process. However, at the same field of endeavor, Jiang et al taught this feature (see col. 1, lines 60-65). At the time of the invention was made, it would have been obvious to a person ordinary skill in the art to incorporate the teaching of Jiang et al adaptive interpolation process into Allen et al system. The motivation doing so is to performing a motion adaptive interpolation at the pixel, using the detected edge direction.

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With regard to claims 16, Allen et al discloses wherein the step (a) carries out the first interpolation on the input pixels using bi-linear interpolation (see col. 3, lines 18-23).

Claim 20 is similarly analyzed as claim 15, except claim 20 is an apparatus claim.

***Allowable Subject Matter***

2. Claims 4, 7, 11, 13, 14, 17, 18 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Other Prior Art Cited***

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent No. (5,742,354) to Vlahos et al disclose method for generating non-visible window edges...

US Patent No. (5,937,147) to Ng disclose printing of enhanced images.

US Patent No. (4,571,632) to Schaphost et al discloses alternate line interpolation method and apparatus.

US Patent No. (4,906,097) to Wiedemann disclose imaging and inspection apparatus and method.

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US Patent No. (6,381,035) to Zhang et al disclose edge compaction in antialiased mages.

US Patent No. (6,628,330) to Lin disclose color interpolator and horizontal/vertical edge enhancer...

### ***Conclusion***

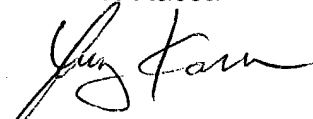
4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to YOSEF KASSA whose telephone number is (703) 306-5918. The examiner can normally be reached on Monday-Thursday from 8:00 AM to 6:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, BHAVESH MEHTA can be reached on (703) 308-5246. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9306 for regular communication and (703) 872-9306 for after Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the customer service office whose telephone number is (703) 306-5631. The group receptionist number for TC 2600 is (703) 305-4700.

### **PATENT EXAMINER**

Yosef Kassa



11/02/04.